

struction in those subjects have already commenced. No provision has as yet been made anywhere for the training of schoolmasters and medical officers in anthropometry, to fit them to take measurements of school children and Army recruits. Yet this branch of anthropology is one of the highest importance, not simply for scientific reasons, but because of its practical bearing on the great question of physical deterioration, which has long engaged the attention of anthropologists and the medical profession, and has lately been discussed in Parliament.

The memorial urges the establishment in London of a bureau in which all the distinguished anthropologists of the kingdom could meet on common ground, as do all the leading mathematicians, physicists, chemists, and biologists in the Royal Society. All the elements of such a bureau already exist in the Royal Anthropological Institute of Great Britain and Ireland. This bureau would collect information respecting the ethnology, institutions, arts, religion, and law of all races, especially of those in the British Empire, and it would publish the notes sent in by observers in all parts of the world, issuing these in the form of bulletins. The bureau might confer a diploma on officials, scientific travellers, and others who had submitted to a proper test of their distinction in some branch of anthropology, and it would approve for certificates schoolmasters and others who had shown themselves competent to make anthropometrical observations in the examinations held under the direction of the bureau. In view of the services which such a bureau would render to the nation, "we respectfully petition His Majesty's Government to make an annual grant of 500*l.* to the Royal Anthropological Institute for carrying out the scheme set forth, and also to grant a suitable set of rooms in the Imperial Institute."

It is not proposed that the teaching of ethnology should form part of the work of the bureau. For many years past instruction has been given in the Universities of Oxford and Cambridge in various departments of anthropology. In the University of London are the only two professors of sociology in the kingdom, and instruction has also been given in ethnology for several years, and the University of Liverpool has a professor of social anthropology. Thus, although most of the teaching appointments are financially starved and work under unfavourable conditions, the foundations have been laid for anthropological instruction in several of our universities.

On March 12 the Prime Minister received an influential deputation at the House of Commons, which presented to him the memorial urging the Government to establish an Imperial Bureau of Anthropology in connection with the Royal Anthropological Institute. Prof. Ridgeway pointed out that the science of anthropology could be of the highest possible service to the State in the training of Colonial and Indian administrators, and that it was also a necessity for commercial success. Sir Edward Candy said, in reply to the Prime Minister, that he would make anthropology a compulsory subject.

The Prime Minister said that he entirely agreed that anthropology was becoming every year more and more, not only an important, but an indispensable branch of knowledge, not merely for scholars, but for persons who were going to undertake the work of administration in an Empire like ours, whether in India or in Crown Colonies. While he would hesitate to express anything like a considered and final opinion as to whether anthropology ought to be included as a compulsory subject for examination, he was quite satisfied that it was highly desir-

able that it should become a regular subject of study, and enter into the normal equipment of young men who went to the outlying regions of the Empire and encountered strange conditions of life. He did not, however, hold out anything like an assurance, or even an expectation, that the pecuniary grant they had asked for would be accorded. Evidently he feared that other learned societies might also urge their claims for Government support, but he did not appear to realise that a grant for a bureau is on a different footing from one merely to a society as such. The need for a bureau of ethnology is urgent, and it should be remembered that to equip a bureau as an independent body would be much more expensive than affiliating it with a society which already possesses the nucleus of the requisite organisation. It is to be hoped that the Chancellor of the Exchequer will be generous to this scheme, which is certainly one of national importance.

An additional argument for the establishment of the bureau is to be found in the Sargent prize essay by the Rev. H. A. Junod, on "The best means of preserving the traditions and customs of the various South African native races" (Report South African Association for the Advancement of Science, 1907 [1908], p. 142). The Rev. H. A. Junod is a sympathetic missionary who is well known for his studies on the ethnology of the Ba-ronga. In this essay he points out how the old lore is passing out of remembrance or becoming modified, and he adds, "What is wanted is a central agency which would receive the materials collected by people on the spot and publish them in a way which would make them available for science at large. There ought to be created without delay a South African Anthropological Commission, which would answer to the need just pointed out." It would be a credit to South Africa if the scheme outlined by M. Junod could be carried out, and all such local enterprises should be affiliated with a central bureau in London.

A. C. HADDON.

NOTES.

MR. HALDANE, Secretary of State for War, will be the guest of the evening at the anniversary dinner of the Junior Institution of Engineers, to be held at the Hotel Cecil on May 1.

THE seventeenth "James Forrest" lecture of the Institution of Civil Engineers will be delivered at the institution on Monday, April 26, by Colonel H. C. L. Holden, R.A., F.R.S., his topic being "Road Motors."

THE grand gold medal for science has been bestowed upon Dr. Sven Hedin by the German Emperor, and the Berlin Geographical Society has presented him with the Humboldt medal of the society.

THE *Times* correspondent at Ottawa states that a Day-light Saving Bill, introduced in the Canadian House of Commons on March 12, was received with laughter and ironical cheering. The Bill proposes that from April 2 to October 2 local time should be observed one hour ahead of the standard time.

WE learn from *Science* that the "sundry civil" Bill for the fiscal year 1910, as reported to the House of Representatives last month, provides for a new building in Washington to accommodate the Geological Survey, the General Land Office, the Office of Indian Affairs, and the Reclamation Service, to cost 500,000*l.*, and appropriates 20,000*l.* for preliminary work in construction.

On Thursday next, March 25, Prof. G. H. Bryan will begin a course of two lectures at the Royal Institution on "Aërial Flight in Theory and Practice." The Friday evening discourse on March 26 will be delivered by Mr. A. S. Eddington on "Recent Results of Astronomical Research," and on April 2 by Sir J. J. Thomson on "Electrical Striations."

In a letter to the *Times* of March 15, Prof. Osler directs attention to the useful work which is being done by the Italian Society for the Study of Malaria, founded ten years ago, for the prevention of malarial diseases. The society has promoted legislation for the gratuitous distribution of quinine, has prepared quinine in its most agreeable forms, and has introduced into practice the mechanical measures based on the defence of the habitation and the individual from the bites of mosquitoes. The result is that the mortality from malaria in Italy has declined from 16,000 in 1902 to about 4000 in 1908. Prof. Osler also points out that the growth of our knowledge of the causation and prevention of malaria illustrates the stages through which so many of the great discoveries in medicine have had to pass, and is a striking example of the value of experimental methods in medical research.

THE Belgian Legation announces that in the year 1911 the annual prize of 25,000 francs (6250*l.*), instituted by King Leopold in 1874, will be awarded for the best work in French, Flemish, English, German, Italian, Spanish, or Portuguese on "The Progress of Aërial Navigation and the most Effective Means for its Encouragement." In that year foreigners will be permitted to participate in the competition, and the award will be in the hands of a jury nominated by the King, and consisting of three Belgians and four foreigners. The works submitted for competition must reach the Belgian Minister of Science and Art before March 1, 1911.

THE *Times* correspondent at Wellington, New Zealand, reports that the Ngauruhoe volcano, which has been quiescent for a year, is in active eruption. On March 8 a quivering of the earth in the neighbourhood of the volcano was felt in the evening, and loud noises were heard. These phenomena were followed by the ejection, first, of a column of steam from the crater, and afterwards of steam and volcanic ashes. The eruption was caused through the blocking of the main vent, which was cleared by the outburst of superheated steam. There was no lava flow, and the volcano remains in the solfatara stage.

THE death is announced of Prof. W. C. Kernot, professor of Engineering in the University of Melbourne. From the *Times* we learn that Prof. Kernot was born at Rochford, Essex, in 1845, and was educated at schools at Geelong, and at Melbourne University, where he graduated with honours in 1864. After being engaged on the Geelong and Coliban water-works, he became lecturer on surveying and engineering at the University, and in 1883 was appointed to the chair of engineering. In 1874 he was chief of the photoheliograph party at the Melbourne Observatory for the observation of the transit of Venus. In 1887 he presented to Melbourne University, as a jubilee gift, the sum of 200*l.* to endow scholarships in physics and chemistry. He also founded a metallurgical department at the University at a cost of 1000*l.* He was president of the Royal Society of Victoria for several years, and was the author of various papers in technical journals.

On the occasion of the celebration of Charles Darwin's centenary in Hamburg last month, Prof. E. Detmer

delivered a eulogistic address on Darwin as a botanist, that is published in *Naturwissenschaftliche Wochenschrift* (February 21). Referring to his labours as an investigator, Prof. W. Detmer selected for consideration Darwin's researches on insectivorous plants, cross- and self-fertilisation, and the power of movement in plants; it is pointed out that the first excels in exact and comprehensive elaboration, that the second entailed an enormous amount of work in order to get details on which to base a generalisation, and the third introduces new ideas and problems in the physiology of perception. There follows an appreciation of Darwin's greatest contributions to the domain of natural science, *i.e.* selection and variation.

A CORRESPONDENT, writing from Freiburg in Baden, sends us an account of a discourse delivered by Prof. Weismann on February 12 last as the commemoration address in connection with the Darwin centenary celebration by the Natural Science Society of Freiburg University. In his oration Prof. Weismann dwelt on Darwin's early shown inclination to the truths and beauties of nature in spite of a dry and dreary education; then on the glories of the welcome voyage, which kept the young student of nature in a state of perpetual rapture; and, again, on the concentration with which Darwin worked in his English country home at the collection of endless facts to construct his theory. Prof. Weismann went on to describe how little impression the Linnæan lecture of 1858 made on the public mind, but how no scientific work has ever made so great a sensation as the "Origin of Species." He himself first read the book two years later, at the period when he had lately thrown up medicine as a profession for zoology, and so was too young in the new subject to have sunk deep into the grooves of the old school, but was freer than most older zoologists, botanists, and other natural sciences to adopt the evolution principles. Prof. Weismann then showed how greatly the evolution theory changed the whole mind of the times, and set new and varied work going in all directions. Men have made progress since 1859 by leaps and bounds in sounding the mysteries of natural sciences, such as embryology, the laws of heredity, and fertilisation. The theory has opened vistas of historical research—such as the history of art and language—in unending perspective. As man has developed from the very simplest beginnings, and has only by degrees reached his present state of high organisation, why should we suppose that we have reached the end and object of the process? The longer the human race exists, the more will it strive for what is higher, purer, and nobler, towards a life dedicated less for selfish and more for general good. Therefore, indeed, do we owe much to Darwin, not alone as a benefactor to science, but as a benefactor to the aims of humanity.

THE report of the council of the Ray Society, read and adopted at the annual general meeting on March 11, recorded some interesting facts as to the position of the society and its publications. There has been a decided increase in the membership of the society since the previous report was presented, the numerical strength being now greater than in any year since 1895. One of the volumes for the year, the "British Desmidiaceæ," vol. iii., by Mr. W. West and Dr. G. S. West, was issued in the first week of December last. The publication of the other volume, the "British Rhizopoda," vol. ii., is delayed owing to the death of Mr. James Cash, which occurred on February 20. For the present year a supplementary part of the "British Nudibranchiate Mollusca" is in preparation by Sir Charles Eliot. The forthcoming zoological works

are the "British Centipedes and Millipedes," by Mr. Wilfred Mark Webb; the "British Parasitic Copepoda," by Dr. Thomas Scott and Mr. Andrew Scott; the "British Hydrachnidae," by Mr. C. D. Soar and Mr. W. Williamson; the "British Ixodoidea," by Mr. W. F. Cooper and Mr. L. E. Robinson; and the "Earwigs of the World," by Mr. Malcolm Burr. The only new botanical work promised is one on the "British Characeæ," by Messrs. Henry and James Groves. Lord Avebury, F.R.S., has been re-elected president of the society, Mr. DuCane Godman, F.R.S., treasurer, and Mr. John Hopkinson, secretary.

THE commemoration of the jubilee of the discovery of the source of the White Nile was celebrated by a meeting of the Royal Geographical Society, at which a paper was read by Sir W. Garstin, published in the February number of the journal of the society, entitled "Fifty Years of Nile Exploration, and some of its Results." The paper begins with a good summary of exploration prior to 1898, when the power of the Khalifa was overthrown and the Sudan re-conquered by the Anglo-Egyptian forces. An account is given of the hydrography of the river, and of the measures taken in recent years to develop its water supplies for the irrigation of the Delta. There is also a lucid account of the functions in this respect of the White and Blue branches of the river, which "automatically compensate each other, so that at the time one system is passing on a large volume of water, the other is storing up its discharge, and when the former begins to decrease in volume the stored water takes its place, and makes good the deficiency. The comprehension of these facts is, I consider, one of the most important results of our studies of the Nile since 1898." Another interesting paper in the same issue of the journal is that on the Panama Canal in 1908, by Dr. Vaughan Cornish. The probable total cost of the work is, he says, unknown, but Colonel Goethals has stated in evidence that it will be at least 250, and possibly 500 million dollars. A lively discussion followed, in which Colonel G. E. Church estimated the commerce which would possibly go through the canal, if it were now complete, at less than a million tons. On the question of its strategic value he was equally pessimistic. The monthly bibliography of geographical literature, which is a distinguishing feature of the journal, is as good and as indispensable as ever.

AN interesting work of engineering is being carried out in the construction of a railway tunnel under the river Detroit, which runs between the United States and Canada. There are no fewer than five railways that cross this river between Windsor and Detroit, the service being maintained by means of ferry-boats of such a size that there is room on deck for a complete passenger train or half a freight train. The time occupied in crossing the river, which is half a mile wide, including the loading up of the trains and the crossing, is from thirty to forty minutes for a passenger train, goods trains being often delayed three to four hours. The tedious delays in the transport of passengers and goods occasioned by the crossing of the river have for some time past been the constant subject of complaint, and various schemes have been brought forward to remedy this. A bridge is impracticable, owing to the interference it would cause to the river traffic between the Great Lakes, this being equal in tonnage to that which passes through the Suez Canal. Finally, a scheme was settled for a tunnel, the method of construction adopted being somewhat novel. This tunnel consists of two steel tubes placed 42 feet below the surface of the river, each 16½ feet in diameter, running parallel with each other,

but 3 feet apart. For the reception of these a trench is first dredged in the bed of the river, which consists of clay, 48 feet wide at the bottom; as this proceeds piles are driven in the bottom of the trench by a floating pile-driver, and on these is laid a steel and concrete grillage, on which the tubes are bedded. These are made of riveted steel, each 262 feet long, 23 feet 4 inches inside diameter. These weigh 600 tons, and are made at a yard twenty-four miles distant, and conveyed to the site of the tunnel by water. Before launching the ends are plugged by a timber bulkhead. When the tubes are in position, inlet and outlet valves are opened, causing them to sink. Divers are employed to ensure that the diaphragms rest firmly on the grillage. The forward end of each tube has a sleeve 17 inches long, which fits over the end of the tube previously sunk, the flanges being bolted to the one previously laid. The trench in which the tubes are placed is then filled up with cement concrete, completely embedding them. The concrete is lowered through 12-inch tubes from a barge. When completed, the trains are to be worked through the tunnel by electricity.

To the Museum Conference held last year in Ipswich the Rev. J. S. Whitewright contributed a paper on pioneer museum-work in China, which is printed in the February number of the *Museums Journal*. The author, it appears, opened in 1887 a small museum in the city of Ching-chon-fu, in Shantung, with the view of opening the minds of the Chinese and of establishing a basis of common interests. The result was, on the whole, successful. One member of the upper classes was, indeed, inclined to be supercilious, and stated that there could be no such thing as electricity; if there were, the Chinese would have known all about it years ago. An introduction to a magneto-electrical machine convinced the sceptical visitor of his error, and he left the premises a more enlightened, if a sadder, man, with a full conviction of the powers of electricity. The exhibits in the museum consisted principally of maps and globes, diagrams illustrative of elementary physiography, geology, astronomy, and natural history, specimens of natural-history objects and manufactures, electrical apparatus, and models of engines.

A CLASSIFIED and selected catalogue of botanical publications, including a number of rare books, has been received from the publisher and second-hand bookseller, W. Junk, of Kurfürstendamm, Berlin. It contains a list of nearly seven thousand titles; the prices are apparently for new copies where these are obtainable, but in other cases for second-hand copies. The catalogue is intended to be kept for reference purposes, as it is printed on good paper, bound, and furnished with a preface, in which the publisher discourses chiefly on prices.

A CONTRIBUTION by Prof. G. Haberlandt to the *Sitzungsberichte der kaiserlichen Akademie der Wissenschaften* (vol. cxvii., part vi.), Vienna, on sense-organs in leaves, is noteworthy because it furnishes a reply to an adverse critic regarding the existence of such devices in a number of common plants. The author takes each species in detail, and finds in every case arrangements of one kind or another which he regards as functional. In *Sorbus terminalis* the arrangement is provided by a cup-shaped depression of the mucilage; the shape of the cells is peculiar in *Chelidonium majus* and *Phyteuma spicatum*, and in *Morus alba* it is maintained that the cystolith, being of a special type, might function as a light collector.

A STUDY by Messrs. W. W. Robbins and G. S. Dodds of the plant distribution on the slopes known as "mesas,"

near the city of Boulder, Colorado, is published in the University of Colorado Studies (vol. vi., part i.). The "mesa" lies between the lowest range of hills and the plains, in the present instance at an altitude of from 5500 feet to 6500 feet. *Pinus scopulorum* is the chief feature in the landscape; it extends downwards from the hills, especially on the northern slopes of the mesas, where it gives shelter to various bushes until it is checked by grass-land. *Berberis repens* and *Yucca glauca* occupy localised positions, and two species of *Ceanothus* grow on the dry slopes. *Symphoricarpus occidentalis* plays an important part in distribution, as it first colonises embryonic ravines, being followed by roses, currants, and *Rhus trilobata*; but eventually species of *Cratægus* become dominant in the ravines and gulches.

An interesting experiment is recorded by Mr. Thornton in the January number of the *Agricultural Journal of the Cape of Good Hope*, which, although in no sense novel, is of considerable technical importance. It was found that the yield both of barley and wheat is much increased by cultivation, and the most thorough cultivation tried gave the largest profit. The use of machinery tends to diminish the cost of cultivation, and it is highly important in a country like Cape Colony, where fertilisers are dear, for farmers to be shown how to increase their crops without at the same time sacrificing any profit.

THE results of several years' feeding trials at Cockle Park are issued as Bulletin No. 12 of the Armstrong College, Newcastle-upon-Tyne. Comparisons are made between several varieties of cake, including Indian cotton cake, earth-nut cake, sesame cake, and niger cake; several other foods were also the subject of experiment. The results are expressed as gains in live weight, and an estimate of the cost is given. There is also a list of equivalent values of food-stuffs, some of which have been established by experiment, while others are only calculated; on this basis several rations for fattening and for milch stock are suggested.

THE question of breeding for milk is one which is attracting considerable attention from practical men, and is of distinct scientific interest. When a deep-milking cow is mated with a bull the dam of which was also a deep milker, it is found that the female offspring yield large quantities of milk, while the males will beget deep milkers. Records of milk yields are therefore useful guides to the breeder; illustrations of their value are not infrequently given in the agricultural Press, and one has lately appeared in the *North British Agriculturist*. On the farm referred to a group of Ayrshire cows has been bred giving the very high average yield of 1144 gallons of milk, containing 3.6 per cent. of fat, during last season, while a group of young cattle are being raised the dams of which averaged 1232 gallons of milk, containing 3.8 per cent. of fat. The sort of variation found in an ordinary Shorthorn herd is shown in Bulletin No. 15 of the Edinburgh and East of Scotland Agricultural College, where the highest and the lowest yields given by cows in the same herd were in the year ending July, 1906, 1505 gallons in forty-seven weeks, and 478 gallons in thirty-nine weeks, and in the year ending July, 1908, 1224 gallons in fifty-two weeks and 438 gallons in twenty-six weeks.

It has long been known that the Gypsies, like other Oriental races, were acquainted with the use of poisons. According to some authorities they employed preparations of certain fungi or mushroom spores. Borrow and other writers on Gypsy lore have recorded that formerly they were in the habit of poisoning pigs and eating their flesh.

One peculiar poison, known to Gypsies under the name of drab, which has never been satisfactorily identified, has recently been studied by Mr. J. Myers, who records the result of his investigations in the January number of the *Journal of the Gypsy-love Society*. On apparently fairly good evidence, he identifies it with barium carbonate, known in Shropshire under the names of witherite or water-spar. Prof. Sherrington gives his opinion that the flesh of a pig poisoned with this substance might be eaten with perfect safety provided the entrails were rejected and the parts of the animal which might have come in contact with them carefully washed. It is also remarkable, as Mr. Myers shows, that when Barrow himself was poisoned, an incident in his life of which he gives an account in "Lavengro" (chapter lxxi.), the symptoms which he describes appear to be typical of barium poisoning. Sir H. D. Littlejohn, who was inclined in Borrow's case to suspect a vegetable narcotic, now agrees that a good case has been made out for the use of barium.

THE report of the chief of the U.S. Weather Bureau for the fiscal year 1906-7 has been received. In continuation of the useful plan adopted in 1903-4, the tables contain twice-daily values of the principal meteorological elements for 1906 for twenty-nine stations, selected to cover as nearly as possible all sections of the United States. These are followed by monthly and annual summaries for 189 stations, and by monthly and annual values of temperature, rainfall, &c., with dates of first and last killing frosts for a large number of stations, from the records of both voluntary and official observers, the whole of the tables extending to 402 large quarto pages. The administrative report directs attention to the valuable researches at Mount Weather Observatory, among which we may specially mention solar radiation and the daily investigation of the upper air. With regard to the latter, Prof. W. L. Moore considers that it is the one line of inquiry that at present holds out the greatest promise of immediate utility. In our issue of January 14 we referred to that part of the report that relates to wireless telegraphy; the distribution of weather forecasts and special warnings over the land areas has reached enormous proportions; at the close of the fiscal year, 1633 telephone companies were cooperating with the Bureau in the dissemination of the reports. Meteorological observations for Greenwich noon are collected from various oceans, for which forms and franked return envelopes are supplied, the observers using their own instruments. The number of vessels cooperating during the year was 1216, of which more than half were British; the great majority of the observations refer to the North Atlantic.

In the Memoirs of the Indian Meteorological Department (vol. xx., part vii.) Mr. J. H. Field gives an account of the kite flights in India and over the neighbouring sea areas during the south-west monsoon period of 1907, in continuation of the useful experiments made in 1906, and described in vol. xx., part ii. (*NATURE*, July 23, 1908). The work on land, at Belgaum, lasted from July 11 to August 3, but it was only during the first week of that period that successful flights were made. The records were unfortunately few, but the conclusions indicate that at Belgaum (Bombay Presidency) the wind direction, from the surface upwards, showed increasing rotation as the wet weather approached. Temperature gradients during ascents were considerably greater in the lower stratum than the adiabatic rate for unsaturated air, and considerably smaller during descents, later in the day. At levels above 400 metres gradients during descents varied from

about -0.4°C. to -0.6°C. per 100 metres. An upper limit to the humid layer was reached at about 1000 metres only on one day during completely dry weather, but if it persisted afterwards, as the weather changed, it must have been at more than three times that height. In the Bay of Bengal and the Arabian Sea the experiments were made between August 24 and September 4. Over the latter the conclusions show that the following conditions obtained:—(1) The velocity of the wind increased appreciably with height, and the direction became west at 1800 metres, irrespective of the direction of the surface wind. (2) Temperature gradients were very nearly adiabatic up to about 500 metres, and afterwards decreased to about half that rate. (3) Absolute humidity remained fairly constant up to 400 metres, and afterwards decreased to quite low values. The results for the Bay of Bengal, so far as they go, indicate conditions similar to those of (2) and (3); no question of estimating wind velocity or direction arose, for the air was practically calm at the surface.

THE *Physical Review* for February contains a paper by Mr. Willard J. Fisher, of Cornell University, on the variation of the viscosity of a gas with temperature. The gas to be tested is forced to and fro through a capillary tube contained in an electric furnace, the pressures used being read on a mercury manometer, and the temperatures by means of a platinum thermometer. As the result of experiments on air and nitrous oxide, the author concludes that the viscosity of a gas is proportional to the quotient of the $3/2$ th power of the absolute temperature by a linear function of the absolute temperature. The constants which enter into the expression of this relation appear to vary from gas to gas, and Mr. Fisher hopes, by determining them for a large number of gases, to establish a connection between them and the chemical constitution of the gas.

THE new vessel by means of which the Carnegie Institution of Washington intends to continue the magnetic survey of the world is described in the *Scientific American* of February 20. In order to render this vessel non-magnetic, she is constructed of timber, white oak, yellow pine, and Oregon pine being extensively used. The fastenings consist of locust tree-nails, copper and Tobin bronze bolts, and composition spikes. The only magnetic materials used are the thin cast-iron liners of the cylinders and the steel cams for the valves of the six-cylinder internal-combustion engine with which the vessel is fitted for manœuvring purposes, the remainder of the engine, shaft, and propeller being constructed of bronze. The vessel is 128 feet 4 inches long on the load water-line, and has a displacement of 568 tons with all stores, &c., on board. The auxiliary engine is to be operated by gas from a producer plant using anthracite peas. The vessel is to have full sail-power with a brigantine rig, and is being constructed at Tebo's Yacht Basin, Brooklyn.

WITH the advent of tall buildings, many new problems have had to be considered by the engineer and builder. The solution of some of these problems regarding the foundations of lofty buildings in American practice is dealt with in an exceptionally interesting manner by Mr. Frank W. Skinner in the *Century Magazine* for March. In lower New York the rock extends usually 50 feet below the surface, and is covered to a depth of 30 feet or more with water and quicksand. In addition to the responsibility of founding a new building weighing, perhaps, 50,000,000 lb., and of a height of about 400 feet above the pavement, the engineer is held by law in New York to be responsible for any damage to surrounding property, if its foundations are more than 10 feet deep. Very frequently existing build-

ings rest on such poor foundations that they must be underpinned. The recent practice has been to adopt the Breuchaud method of forcing long steel hollow columns by hydraulic pressure right down to bed-rock. These are then filled with concrete, and finally built over and wedged so as to carry the weight of the existing building. New foundations are often laid on the surface of the sand, which at 30 feet below surface will carry safely 6000 lb. to 8000 lb. per square foot. In modern practice such foundations consist of a layer of concrete a foot or two thick having rows of steel beams bedded on it, and set closely together. The columns of the structure rest on these beams. Settlement is found to be small. Chicago raft foundations, pile foundations, and caisson construction are also clearly explained and illustrated with many drawings and photographs.

BULLETIN No. 75, part iv., Bureau of Entomology, U.S. Department of Agriculture, by Dr. G. F. White, deals in a popular manner with diseases of bees, their prevention and treatment.

WE have received a "Selected Bibliography on Sanitary Science and Allied Subjects," by Prof. Arthur Smith, University of Colorado, which has been prepared with reference to the needs of students pursuing the course in sanitary science at the University. The selection seems to have been carefully made, and includes many British authors (*The Daily Camera*, Boulder, Colorado, pp. 37, price 80 cents).

THE *Annals of Tropical Medicine and Parasitology* for February (ii., No. 4), issued by the Liverpool School of Tropical Medicine, contains several important papers. One, by Prof. Moore and Drs. Nierenstein and Todd, deals with the experimental treatment of trypanosomiasis with anilin colours and various combinations of atoxyl with mercury. As a rule, though life may be prolonged in experimental infections with *Tr. brucei* and *Tr. gambiense*, no method was able to cure a well-established infection.

A SIXTH edition of the second part of the "Elementary Practical Chemistry" by Dr. Frank Clowes and Mr. J. B. Coleman has been published by Messrs. J. and A. Churchill. This section of the work deals with qualitative and quantitative analytical chemistry, and in the present edition additions have been made to the volumetric portion and to the preparation of inorganic compounds.

MESSRS. A. GALLenkAMP and Co., LTD., have issued a comprehensive catalogue (No. 52) of charts, maps, hygienic and anatomical models, and lantern-slides they are in a position to supply. Both diagrams and slides are available to illustrate most subjects of science, and the detailed summary which the catalogue provides should save teachers much time in looking through the lists of individual publishers.

THE Natural Science Society of Wellington College continues its excellent work in the direction of maintaining the interest of the boys at Wellington in scientific subjects. A copy of the thirty-ninth annual report, which summarises the work accomplished during 1908, has reached us. The majority of the subjects of the Saturday lectures were scientific and refreshingly varied in character. The meteorological data recorded are, as usual, very complete, and indicate the useful part public-school boys can take in scientific observation.

ANOTHER example of the thoroughness with which the work in connection with the Carnegie Institution of Washington is done is afforded by the recently published "Guide to the Manuscript Materials for the History of the United

States to 1783, in the British Museum, in Minor London Archives, and in the Libraries of Oxford and Cambridge." This large volume runs to 500 pages, and has been prepared by Prof. C. M. Andrews, of the Johns Hopkins University, and Miss Frances G. Davenport, of the Carnegie Institution. The volume is but one of a series, of which two volumes have appeared previously, in which the Carnegie Institution proposes to present inventories guiding the student of American history to such manuscript materials as are to be found in the archives and libraries of foreign countries.

OUR ASTRONOMICAL COLUMN.

STELLAR EVOLUTION.—In discussions appertaining to the evolution of individual masses in the cosmos, two hypotheses have received a great deal of attention, the first being that of Laplace, in which masses are thrown off by a condensing nebula, the second, due to Darwin, in which the subdivision is due to fission caused by tidal strains.

In No. 1, vol. xxix., of the *Astrophysical Journal*, Prof. Moulton discards the former, on the lack of evidence, and discusses the probability of the latter theory.

His results are not favourable to the fission theory, and applying them to the members of the solar system it appears unlikely that the planets originated by fission from a parent mass; similarly, he concludes that the moon and earth have not originated by fission from a common parent mass.

Again, in reference to multiple stellar systems, the type of fission discussed by Prof. Moulton appears to be ruled out of court as the factor producing such systems unless the parent nebulae had originally well-defined nuclei.

Prof. Moulton states that up to the present it has been assumed that evolution took place from the nebulous state to the stars; he suggests that both aggregation and dispersion of matter should now be considered as possible factors in cosmological evolution.

HALE'S SOLAR VORTICES.—In an English reprint of the Proceedings of the Koninklijke Akademie van Wetenschappen to Amsterdam, at the meeting held on January 30, we find a criticism of Hale's theory of solar vortices by Mr. A. Brester, Jz., whose work on periodicity in the sun and variable red stars was reviewed in *NATURE* for February 11 (p. 431, No. 2050).

Mr. Brester gives reasons for doubting the existence of material vortices, and ascribes the varying configurations of the flocculi and the spectral-line displacements to the action of submerged radio-active substances from which issue forth, through spot cavities, β and γ rays, which, in turn, cause the stationary matter of the solar atmosphere to become variably luminescent.

COMET TEMPEL₃-SWIFT, 1908d.—Observations of comet 1908d were made at the Algiers Observatory by MM. Rambaud and Sy on nine dates between October 29 and December 3, 1908. In the 12½-inch *coudé* equatorial the comet was a very feeble, nebulous object with a scarcely perceptible condensation; the coma was round, and of about 2' diameter (*Astronomische Nachrichten*, No. 4307).

THE CAPE OBSERVATORY.—Mr. Hough's first report of the work done at the Cape Observatory covers the two years 1906 and 1907; owing to the change of directors, consequent upon the retirement of Sir David Gill in February, 1907, no report for 1906 was issued.

The discussion of the azimuth determinations made in 1906 showed that, although the underground azimuth marks themselves were quite stable, there was a persistent systematic difference in the results, apparently depending upon the position, east or west, of the instrument; subsequent investigation showed that this error was due to a loose jewel in the end bearing of the micrometer screw.

An improved system of circulating the air in the prism box has greatly improved the working of the line-of-sight spectroscope. The transit-circle, the heliometer, and the equatorials were in constant use, and brief summaries of the observations made are contained in the report.

The astrographic chart work is well advanced, the total number of plates now measured being 1285, containing

some 700,000 star images, corresponding to nearly 300,000 different stars.

During the two years under report, 496 stellar spectra, mostly selected for a spectroscopic determination of the solar parallax, were taken with the four-prism spectrograph attached to the Victoria (24") telescope. The radial velocities of α Tauri, α Orionis, α Canis Majoris, β Geminorum, α Boötis, α Centauri, and α Scorpii are completely reduced, and await final discussion.

HOURS OF SLEEP FOR CHILDREN.

THAT a child needs proper sleep and longer hours of sleep than an adult is such a well-recognised fact among common-sense people that it seems strange it should still be necessary to preach it to the public. Sir James Paget so long ago as 1857 pointed out the physiological reasons for this necessity, in that organic processes are performed with rhythm, and the habitual alternation of activity and rest is an all-important factor in the realisation of the highest potentialities of the growing child. It is during the hours of sleep that growth due to the building up or anabolic side of metabolism is most in evidence, and anabolism is specially necessary in children, not only to repair the wear and tear of the day's activities, but also because the child is growing. Eminent alienists such as Sir James Crichton Browne and Dr. Clouston have supported these views, and have shown the bad effects want of rest has on the mental as well as the physical well-being of the child. Dr. Rayner, formerly medical superintendent of Hanwell Asylum, in his evidence given last year before the Royal Commission on the Care of the Feeble-minded, said, "I have had normal children brought to me as defective simply as a result of insomnia."

A few years ago Dr. Theodore Acland brought the question before the public, in a letter to the *Times*, in relation to the hours of sleep in boys' public schools. Schoolmasters, as a rule, are extremely conservative, and regard early rising as a useful method of discipline. Dr. Acland was supported by Dr. Clement Dukes, and it is to be hoped that their efforts have been successful in modifying the customs at such schools, and that the means of "hardening" adopted there may be changed in favour of methods which may be less harmful to the physique of the boys.

It is, however, not only in the schools and homes of the better classes that the evil prevails, and the aspect of the question in relation to the poor has been specifically dealt with in an article by Miss Alice Ravenhill (*Child Study*, vol. i., No. 4, January), which deserves wide publicity. Her investigations, illustrated by examples, abundantly prove that this most important time law of regular sleep is heedlessly violated, and the penalties exacted are both far-reaching and heavy. The hours of sleep are curtailed at both ends; late hours of retiring are the custom owing to a failure to appreciate that the child is not an adult; early rising is regarded as a necessity among the poor because the miserable pittance the children earn before school time are held of greater value than their normal development into efficient citizens; the quality of the sleep itself is poor, for few of the mites have a bed to themselves, and sleep often three, four, or even five in the same bed. Miss Ravenhill gives cases where a retirement at 10 p.m. or 11 p.m. at night is followed by rising for milk rounds at 5.30 a.m. or 6 a.m. This frequently occurs in children six years of age, and the proportion of early risers increases as the children reach the errand-boy age of ten or eleven. There are further exceptional cases where rising for market at 3 a.m. or 4 a.m. is mentioned.

The returns for girls are not so complete as for boys, but the evidence is abundant that the suffering is widespread in both sexes, and the range of occupations pursued is almost incredibly various.

This is a matter which a great nation should speedily rectify. The facts are collected and are indisputable, action ought to be immediate; parents must be instructed on this and other points of elementary hygiene, and legislation on the subject appears imperative.